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ALL ABOUT LIZARDS



OVERVIEW

Lizards represent a large group of reptiles with thousands of different species. Each lizard has characteristics that help it live and thrive in its particular environment. These activities will enable students to explore the diversity of lizards in terms of characteristics, behavior, habitat and help them to identify a special characteristic of each lizard that helps it thrive in its habitat.

Skills: Analysis, observation, conducting an experiment

Range: Grade 1-4



THE SCIENCE IDEA

Lizards are a diverse group of reptiles that have adapted to survive in very different habitats. Gecko lizards make use of millions of tiny electric forces to attach to surfaces and climb upside down. Thorny Devil lizards use capillary action to draw water along grooves in their spiny backs and harvest every last drop of water available in their harsh dry environment. Chameleon lizards have pigmented cells that they can use to change their skin color and camouflage. Draco lizards use the power of gravity, surface area and flight to travel from tree to tree. By exploring the special adaptations of different lizards, students will gain a comprehensive understanding of how this group has diversified to adapt and thrive in specific habitats.



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WHAT TO DO

GRIP LIKE A GECKO

In 2002 the great mystery of how geckos can climb smooth walls and ceilings was finally uncovered. Scientists found that geckos make use of electrostatic forces in order to keep a firm grip when climbing on smooth walls and across ceilings. Each gecko toe has tiny hairs that branch out into hundreds of tiny endings. Each branch of the hair (also called setae) attach to the surface by a weak electrostatic attraction. A tokay gecko has 6.5 million setae that each branch into hundreds of ends—together these create enough electrostatic attraction to support the weight of two human adults! Gecko toes can detach from surfaces in milliseconds, and don't have any residue.

The explanation of positive and negative charges as part of electrostatic attraction can be tailored to fit your class. For a full explanation please see this site:

<http://www.sciencemadesimple.com/static.html>

At any grade level the most important information is that electrostatic attraction involves positive and negative charges that attract each other.

One of the best ways to explore electrostatic attraction is the balloon test.



What you will need:

1 balloon per student

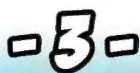
A flat surface (wall, sheet of plywood)

A stop watch

A table to record results (be sure to have columns for Time charged, Time held, and Surface)



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WHAT TO DO

GRIP LIKE A GECKO (CONTINUED)

What to do:

1. Have students blow up the balloons and tie them off.
2. Start by having students rub the balloons on their hair for 10 seconds (mark this time in the Time charged column)
3. Students should move to the wall (or flat surface) immediately after and try to suspend their balloon gently on the wall (place it gently against the wall).
4. Measure the length of time the balloons stay suspended against the wall. Record the longest time.
5. Continue the experiment varying the amount of time the balloons are charged by rubbing against the students heads.
6. Another option is to vary the surface to which students suspend the balloons. Try incorporating glass, a wall, a blackboard, a flat piece of wood. Encourage students to seek out other options for the experiment and be sure to record all the results.
7. At the end discuss the results of the experiment.
 - a) What variables resulted in the longest suspension of a balloon?
 - b) Did the charge time make a different in the suspension time of the balloon?
 - c) Did different surfaces make a difference in how well the balloon suspended?



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WHAT TO DO

DRINK LIKE A THORNY DEVIL

Thorny devils live in an environment with very little water! They need to take advantage of all the water they can—like rain water, standing water, soil moisture, and dew. They do this by taking advantage of the grooves on their skin which channel water to their mouths through capillary action! In this way rain water and dew that falls on their back is collected and channeled towards their mouths.

Students can investigate capillary action through a simple experiment

What you will need:

A sheet of paper towel per group

2 clear drinking glasses per group

1000 ml of colored water (food coloring)



What to do:

1. Assign students to groups
2. Have one student twist the paper towel until it is a tight long rope.
3. Pour the colored water ($\frac{3}{4}$ cup) into one of the 2 glasses for each group.
4. Students place one end of the paper towel in the water and the other end in the empty glass.
5. Have students observe what happens and record their findings to share with the class

Students should see their paper towel starting to get wet, and because the water is colored, they can observe it moving up the paper towel. After a few minutes they will see that some water has started to pool in the glass that was empty! This process is called 'capillary action,' the water uses this process to move along the tiny gaps in the fiber of the paper towels. This is the same process that can be seen in plants as water moves through the stem.



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WHAT TO DO

BLEND LIKE A CHAMELEON

Chameleons have an amazing ability to blend into their environment by changing their color. This ability comes from special cells in their skin called chromatophores that are filled with different kinds of pigment. These cells work together to help the chameleon blend in with its environment so perfectly it is easily hidden!

Students can experience the effects of camouflage first hand with a simple experiment.

What you will need:

3 large sheets of colored paper (2 of the same color and 1 very different color)

1 sheet of black and white patterned paper marked off into a grid of 2 inch by 2 inch squares.

Scissors

A stop watch per group (or one per class)

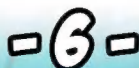
A sheet of paper and a pencil to record results

What to do:

1. Place students in pairs.
2. Have students cut out the squares according to the pattern on 2 of the colored sheets and the black and white patterned sheet. Have them mix up the squares.
3. One student closes his eyes while the other places the squares in a mixed pattern on the large colored sheet. Now there will be one set of squares that matches the background, and 2 sets of squares that do not match.
4. Once the squares are placed, the student who closed their eyes can open them, and has 5 seconds to pick up as many of the colored squares as he or she can.
5. The observing student should record how many squares were picked up in the 5 seconds and their colors. Repeat the experiment several times (switching the students roles between observer and picker) and at the end calculate which squares were picked the most.
6. Have the students discuss why they think the experiment yielded this result.



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WHAT TO DO

GLIDE LIKE A DRACO

The draco lizard is able to glide from tree to tree using special 'wings' that evolved out of its ribs. These 'wings' are pieces of skin and rib that can be spread out on each side. As the draco takes off from its perch, it spreads out the wings and uses them to glide to another tree sometimes up to 200 feet away!

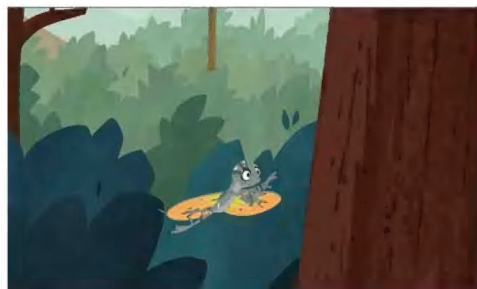
Students can explore the science of gliding with a simple paper airplane experiment.

What you will need:

Recycled copy paper to make planes

A long tape measure (for each group or per class)

A piece of paper and pencil to record results (for each group)

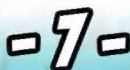


What to do:

1. Be sure to make space in the room by pushing the desks to one side.
2. Lay out the measuring tape(s) parallel to each other leaving lots of space for the different planes to fly and land.
3. Have students make different paper airplanes. You can download instructions to different styles of paper airplanes here: <http://www.paperairplanes.co.uk/planes.php>. As well, encourage students to invent their own design of paper airplane!
4. Have students number each plane and make a list of the numbers so they can keep track of how well each plane glided.
5. Students take turns gliding the planes and recording how far they flew using the tape measure. If students experiment with modifying the planes as they go, make sure they record the modifications and the results so they can look back and compare the changed design to the original.
6. If there are many groups gliding planes, have each group pick their best plane and have a 'glide off'!
7. At the end look at the design of the winning plane and the losing plane. Which plane stayed in the air for the shortest time and why? What do you think caused the winning plane to stay in the air for such a long time and how far did it glide?



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TAKE IT FURTHER

Extend learning with additional ideas for your classroom

NEW LIZARD DISCOVERY!

Have students draw pictures of the different lizards they explored in class. Place each species on a poster board and label it with the name, species name, and special feature the lizard has that enables it to survive in its environment. Place the pictures at the front of the class and review the different features of the lizards.

New species of lizards are being discovered by scientists all the time. In 2010 a new species of giant, secretive, colorful and fruit-eating monitor lizard was discovered in the Philippine forest. This new species is called the Northern Sierra Madre Forest Monitor Lizard and it grows to up to 6 feet long and weighs about 22 pounds. In 2010 in Vietnam, a new all female species of lizard was discovered by a scientist and in 2009 in India a new species of gecko was discovered. Have the students invent a new species of lizard using features that from the lizards discussed in class. Separately or in groups, have them present their new species of lizard in the front of the class. Make sure students include the geographic location of the lizard, its habitat, and how its characteristics help it survive in the chosen habitat. As well, encourage students to imagine how they discovered the new species and to share the story with the class.

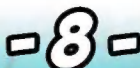


LIZARDS UP CLOSE!

Invite a local herpetology pet store to bring some different lizards to class. Many stores have herpetology specialists to make educational presentations with their lizards. Be sure to discuss beforehand what species will be present and the what will need to be prepared before the visit. Ensure that the lizard species that will be present are safe for handling by the children, or that safety precautions will be in place if they are not easily handled.



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MORE WAYS TO DISCOVER AND LEARN

GO ON AN ADVENTURE

Organize an outing in your area. Some options include:

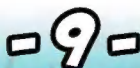
1. If there is a zoo or museum with lizards on display in your area, contact the herpetology curator and try to arrange a behind the scenes visit in order for students to explore up close the habitats each lizard is accustomed to. Encourage students to take notes on the tour which can be added to the posters of the different known lizard species that they created.
2. Go on a lizard walk! Many areas have local species of lizards that prefer different habitats. You can search online for a list of species that occur in your local area and where you might find them. Be sure to print out pictures so that if students do see lizards they can try to identify them. Find a local park or nature walk that is well known and safe and have students keep alert for lizards during the walk. If they do see one, have them record the date, time, and specific location of the sighting (on a tree, in the grass, near water). This can give clues to the species identification as well. If you are unsure of where to find lizards in your area, local herpetology groups, herpetology researchers at the local university and even some pet stores that specialize in lizards can be great sources of information on where to spot some local lizards!

LITERACY CONNECTION

Lizards in the news. Have students search the web and compile articles on recent discoveries of new lizard species. Students can create a New Lizard guidebook by creating entry pages for the new species they read about online. Have students include the following information on each page: common name, scientific name, habitat, diet, size, behavior and the name of the person who discovered the new species. Students can fill in as much information as is available. If there is some information that is missing, students can periodically update their New Lizard guidebook by searching for updates on the recently discovered species and by adding in the new species discovered since the last update! Keep the book in the class so students can access it easily.



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NEW WORDS

Squamate: The largest recent order of reptiles which includes lizards and snakes. Animals in this order are distinguished by their skin which has scales or shields.

Chromatophore: A cell that contains pigment; usually found in the skin of some lizards and cephalopods. Animals with these cells are able to use chromatophore cells to change color.

Electrostatic attraction: Describes the force exerted on two objects that have opposite electrical charges (positive :: negative)

capillary action: The movement of a liquid along the surface of a solid caused by the attraction of molecules of the liquid to the molecules of the solid.

LOOK IN A BOOK

Use these books to help students learn about lizards :

Fun Facts About Lizards

by Carmen Bredson. Enslow Publishers, 2009.

All About Lizards

By Jim Arnosky. Scholastic, 2004.

Those Lively Lizards

By Marta Magellan. Pineapple Pr, 2008.

OTHER RESOURCES FOR TEACHERS

American Museum of Natural History Lizards & Snakes:

<http://www.amnh.org/exhibitions/lizards/facts.php>

<http://amnhshop.org/education/resources/rfl/web/lizardsguide/teaching.php>

All About Lizards:

<http://www.enchantedlearning.com/subjects/reptiles/lizard/printouts.shtml>



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